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Attorney's Docket No.: 8194-205

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Bottomley
Serial No.: 09/204,734
Filed: December 3, 1998
For: DIGITAL RECEIVERS AND RECEIVING METHODS THAT SCALE FOR RELATIVE STRENGTHS OF TRAFFIC AND PILOT CHANNELS DURING SOFT HANDOFF

Group Art Unit: 2634
Examiner: C. Fan
Confirmation No.: 5861

July 10, 2003

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBMISSION OF ADDITIONAL COPIES OF APPEAL BRIEF

Sir:

Applicant hereby submits three copies of the Appeal Brief, in the above-identified matter, filed on April 3, 2003 as required under 37 CFR 1.192(a). This is in response to the Communication Re: Appeal dated June 27, 2003 which was received by Applicant. Applicant believes that all requirements have now been satisfied and respectfully request the issuance of a patent.

It is not believed that an extension of time and/or additional fee(s) are due. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees/extensions of time believed to be due in connection with this paper may be charged to our Deposit Account No. 50-0220.

Respectfully submitted,

David K. Purks
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Audra Wooten

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April 3, 2003

Box AF
Commissioner for Patents
Washington, DC 20231

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION–37 C.F.R. § 1.192)

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on February 18, 2003.

2. This application is filed on behalf of
   ☐ a small entity
   A verified statement ☐ is attached; ☐ was already filed.

3. Pursuant to 37 C.F.R. § 1.17(c), the fee for filing the Appeal Brief is:
   ☐ small entity $160.00
   ☒ other than small entity $320.00

   Appeal Brief fee due $320.00

   ☒ Any additional fee or refund may be charged to Deposit Account 50-0220.

Respectfully submitted,

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Audra Wooten
Audra Wooten; Date of Signature: April 3, 2003

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APPELLANT'S BRIEF ON APPEAL UNDER 37 C.F.R. §1.192

Sir:

This Appeal is filed pursuant to the "Notice of Appeal to the Board of Patent Appeals and Interferences" filed 18 February 2003.

Real Party In Interest

The real party in interest is assignee Ericsson Inc., Research Triangle Park, North Carolina.

Related Appeals and Interferences

Appellant is aware of no appeals or interferences which would be affected by the present appeal.

Status of Claims

Appellant appeals the final rejection of Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31. As of the filing date of this Brief, Claims 1, 5-9, 12, 15-20, 23, 27-31, and 34-39 remain pending. Claims 6 and 34-39 are allowed and Claims 17 and 28 are objected to, but are indicated as containing allowable subject matter, and, therefore, are not at issue on this appeal. Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 are rejected. The attached Appendix A presents the rejected Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 which are at issue on this appeal as finally

rejected in the Final Official Action of October 18, 2002 ("Final Official Action") and the Advisory Action of January 13, 2003 ("Advisory Action").

State of Amendments

All amendments in the present case have been entered.

Summary of the Invention

The present application is directed to systems and methods that scale for relative strengths of traffic and pilot channels during, for example, soft handoff during code-division-multiple-access (CDMA) communication. Signals are processed from a plurality of traffic channels and a plurality of pilot channels by receiving data samples from a plurality of traffic channels and a plurality of pilot channels. Detection statistics are obtained from the received data samples that correspond to information symbols while accounting for the relative strengths of the plurality of traffic channels and the plurality of pilot channels. The detection statistics are preferably obtained by performing Rake combining while accounting for the relative strengths of the plurality of traffic channels and the plurality of pilot channels. Specification, p. 3, line 27 - p. 4, line 2.

The invention stems from the realization that a mobile radiotelephone is often in soft or softer handoff, in which it receives transmissions from more than one transmitter. The different pilot and traffic channel powers generally are not the same for all base station transmissions. As a result, use of the pilot channel for channel estimation can become a problem. When channel estimates based on the different pilot channels are used to combine signal echoes together, these echoes may be combined with the wrong weighting. Specification, p. 4, lines 3-9.

For example, consider a radiotelephone that receives pilot and traffic channels from two base stations, A and B. Suppose the received power of the two pilot channels is the same, whereas the received traffic channel power from base station A is 10 times stronger than from base station B. Using the pilot channels for channel estimation, the two traffic signals would be combined such that, on average, the signals would be weighted equally. However, for optimum performance, the two

signals should be weighted unequally, giving more weight to the stronger traffic signal from base station A. Specification, p. 4, lines 10-17.

The present invention can solve this problem by employing scale factors for each base station signal. These scale factors are included in the Rake receiver and can account for differences in the relative strengths between pilot and traffic channels. Specification, p. 4, lines 18-20.

More specifically, spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels are processed by receiving data samples from the plurality of traffic channels and the plurality of pilot channels. The received data samples are correlated to spreading codes to produce pilot despread values and traffic despread values. Scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels are formed. A channel response is estimated using the pilot despread values to produce channel coefficient estimates. The traffic despread values are combined to obtain detection statistics that correspond to information symbols using the channel coefficient estimates. The pilot despread values are scaled by the scale factors, which may provide detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels. Specification, p. 4, lines 21-33.

Issues

1. Are Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 properly rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 5,812,542 to Bruckert et al.?

Grouping of Claims

For purposes of this appeal, Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 may be considered as standing or falling together.

Argument

I. Introduction

Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 stand rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 5,812,542 to Bruckert et al. (hereinafter "Bruckert"). Anticipation requires that each and every element of the claim is found in a single prior art reference. *W. L. Gore & Associates Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). Stated another way, all material elements of a claim must be found in one prior art source. *In re Marshall*, 198 U.S.P.Q. 344 (C.C.P.A 1978). "Anticipation under 35 U.S.C. § 102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention." *Apple Computer Inc. v. Articulate Systems Inc.* 57 USPQ2d 1057, 1061 (Fed. Cir. 2000). A finding of anticipation further requires that there must be no difference between the claimed invention and the disclosure of the cited reference as viewed by one of ordinary skill in the art. See *Scripps Clinic & Research Foundation v. Genentech Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q. 2d 1001, 1010 (Fed. Cir. 1991). Additionally, the cited prior art reference must be enabling, thereby placing the allegedly disclosed matter in the possession of the public. *In re Brown*, 329 F.2d 1006, 1011, 141 U.S.P.Q. 245, 249 (C.C.P.A. 1964). Thus, the prior art reference must adequately describe the claimed invention so that a person of ordinary skill in the art could make and use the invention.

As analyzed in detail below, Appellant submits that Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31 are not anticipated by Bruckert and, accordingly, requests reversal of the rejection of Claims 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, and 29-31.

II. CLAIMS 1, 5, 7-9, 12, 15, 16, 18-20, 23, 27, AND 29-31 ARE PATENTABLE OVER BRUCKERT

Claim 1 is representative of the claims on Appeal. Claim 1 recites:

> 1. (Amended Three Times) A method of processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, comprising the steps of:

receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

scaling the pilot despread values by the scale factors to form scaled pilot despread values;

estimating channel responses using the scaled pilot despread values to produce channel coefficient estimates;

combining the traffic despread values, using the channel coefficient estimates, to obtain detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

Appellant respectfully submits that Bruckert does not describe or suggest each and every element of Claim 1. According to Claim 1, pilot despread values are scaled **before** channel responses are estimated from the scaled pilot despread values. In sharp contrast, Bruckert instructs and shows in FIG. 2 that at "step 258, the signals received from steps 253, 255, 256 and 257 are smoothed over time ...". (Bruckert, Col. 9, lines 19-20). At step 259 "the smoothed pilot signals p3 and p'3 from base station 106 are averaged **to produce an estimate of the pilot signal**". (Bruckert, Col. 9, lines33-35). At step 261, weighting coefficients c1, c2 and c3 are determined from the smoothed pilot signals, p1, p2, p3 using three disclosed equations. (Bruckert, Col. 9, lines 39-55). At step 262, "the first plurality of **traffic channels x1, x2 and x3** generated by the first rake receiver 126 **are weighted** by the first plurality of complex weighting coefficients c1, c2 and c3". (Col. 11, lines 5-8). Consequently, Bruckert expressly teaches away from Claim 1 by describing, and showing in FIG. 2, that **estimates of pilot signals are formed (step 259) before traffic channels are weighted (step 262).**

The Final Official Action erroneously characterizes the description of Bruckert as:

> The mathematical expressions on col. 9, lines 41-54 clearly teach that the channel responses are estimated using the scaled pilot despread values (see for example, Y_{104}xp1). The block 261 in Fig. 2 is used for estimating the channel responses.

(Final Official Action, page 8, section 9). However, the referenced mathematical expression forms "complex weighting coefficients c1, c2, and c3", not estimates of channel responses. (Bruckert, Col. 9, lines 39-40). Instead, as described above, Bruckert instructs that estimates are formed at step 259 which are used to form weighting coefficients at step 261, and that are **later used to weight traffic channels**. Bruckert does not describe or suggest either a **scaling of pilot despread values**, or performing such **scaling before estimating channel responses**, as recited in Claim 1.

Appellant further notes that the Advisory Action appears to improperly read the teaching of Bruckert onto **prior art** Figs. 2 and 3 of the present application as a basis for rejecting Claim 1. More particularly, the Advisory Action states:

> The coefficients c1, c2 and c3 are the estimates of channel response because Bruckert et al. teaches that the coefficients ci are channel coefficients (see col. 12, lines 5-10, and see col. 3, lines 34-39). Furthermore, the **teaching of Bruckert et al. is consistent with the instant application**. **According to Figs. 2 and 3 of the instant application**, the received data is split into three paths (202a, 202b and 202c in Fig. 2). Each path generates a demondulated signal (i.e., traffic despread values in Fig. 2) and a weighting coefficient (i.e., channel estimate in Fig. 2). The demondulated signal of each path is weighted by its respective weighting coefficient (see 302a, 302b, 302c in Fig. 3). The weighted demodulation signals are then added together (see 304 in Fig. 3).
>
> On the other hand, in the Bruckert et al. reference, the received data is also split into three paths (132, 134 and 136 Fig. 1). Each path also generates a demodulated signal (176, 180, 184 in Fig. 1; i.e., x1, x2, x3) and a weighting coefficient (188, 190, 192 in Fig. 1; i.e., c1, c2, c3). The demodulated signal of each path is also weighted by its respective weighting coefficient (see 130 in Fig. 1, also see col. 6, lines 4-16). The weighted demodulated signals are then also added together (see 138 in Fig. 1).

(Advisory Action, pages 2-3, emphasis added.) However, Figs. 2 and 3 of the present application are clearly marked and described as **"Prior Art"**. The present application distinguishes the prior art of Figs. 2 and 3 from the invention of Figs. 3 and 4 as follows:

> Baseband processors 110", according to the present invention are shown in Figure 4. **Compared to Figure 2, the pilot despread values are also provided to the combiner 406 and the combining is performed by a scaled combiner 406.** It will be understood that, in general, the two-channel

> despreader 202a-202c can be replaced with any device that forms despread values for the pilot and traffic channels, such as two correlators.
>
> An embodiment of the scaled combiner 406′ is illustrated in Figure 5. **Compared to Figure 3, the traffic despread values are scaled prior to combining.** Scalers 502a-502c scale the complex traffic despread values by a real number multiplication. Scale factors are estimated in scale factors estimator 504, which uses pilot and traffic despread values to form scale factors. Multipliers 203a-302c are used to multiply the scaled traffic despread values and the channel estimates.

(Present Application, page1, lines 1-12, emphasis added). Consequently, Figures 2 and 3 of the present application have been described as prior art and have been distinguished by the Specification as different from the present invention. Accordingly, Appellant respectfully submits that it is improper to read Bruckert onto Figures 2 and 3 of the present application as a basis for rejecting Claim 1. Moreover, as was explained above, expressly teaches away from Claim 1 by describing, and showing in FIG. 2, that estimates of pilot signals are formed before traffic channels are weighted.

For these reasons, Claim 1 and the other pending Claims are patentable over Bruckert.

IV. CONCLUSION

In light of the above discussion, Appellant submits that each of the rejected claims is patentable over the Bruckert reference. Appellant, therefore, requests reversal of the pending rejections and passage of the present application to issue.

Respectfully submitted,

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CERTIFICATE OF MAILING

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Audra Wooten

Audra Wooten
Date of Signature: April 3, 2003

APPENDIX A

1. A method of processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, comprising the steps of:

receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

scaling the pilot despread values by the scale factors to form scaled pilot despread values;

estimating channel responses using the scaled pilot despread values to produce channel coefficient estimates;

combining the traffic despread values, using the channel coefficient estimates, to obtain detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

5. A method according to Claim 1 wherein the step of forming scale factors comprises the steps of:

estimating power on a pilot channel;

estimating power on a traffic channel; and

determining scale factors based upon the estimated powers on the pilot channel and the traffic channel.

7. A method according to Claim 1 wherein the step of forming scale factors comprises the step of forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels using pilot despread values and traffic despread values corresponding to a plurality of delays of a transmitted signal.

8. A method according to Claim 1 wherein the step of receiving comprises the step of receiving data samples from the plurality of traffic channels and the plurality of pilot channels during soft handoff from a first one of the traffic channels to a second one of the traffic channels.

9. A method according to Claim 5 wherein the step of estimating power on a traffic channel comprises the step of estimating an equivalent full rate power on the traffic channel.

12. A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

means for receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

means for correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

means for forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

means for scaling the pilot despread values by the scale factors to form scaled pilot despread values;

means for estimating channel responses using the scaled pilot despread values to produce channel coefficient estimates;

means for combining the traffic despread values, using the channel coefficient estimates, to obtain detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

15. A system according to Claim 12 wherein the scaling means comprises means for scaling the pilot despread values by the scale factors such that the means for combining obtains scaled pilot despread values that are a function of the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

16. A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

means for receiving data samples from the plurality of traffic channels and the plurality of pilot channels;

means for correlating the received data samples to spreading codes to produce pilot despread values and traffic despread values;

means for forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

means for scaling the pilot despread values by the scale factors to form scaled pilot despread values;

means for estimating channel responses using the scaled pilot despread values to produce channel coefficient estimates;

means for combining the traffic despread values, using the channel coefficient estimates, to obtain detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels; wherein the means for forming scale factors comprises:

means for estimating power on a pilot channel;

means for estimating power on a traffic channel; and

means for determining scale factors based upon the estimated powers on the pilot channel and the traffic channel.

18. A system according to Claim 12 wherein the means for forming scale factors comprises means for forming scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels using pilot despread values and traffic despread values corresponding to a plurality of delays of a transmitted signal.

19. A system according to Claim 12 wherein the means for receiving comprises soft handoff receiving means.

20. A system according to Claim 16 wherein the means for estimating power on a traffic channel comprises means for estimating an equivalent full rate power on the traffic channel.

23. A system for processing spread spectrum signals from a plurality of traffic channels and a plurality of pilot channels, the system comprising:

a receiver that receives data samples from the plurality of traffic channels and the plurality of pilot channels;

a correlator that correlates the received data samples to spreading codes to produce pilot despread values and traffic despread values;

a scale factor estimator that estimates scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels;

a scaler that scales the pilot despread values by the scale factors to form scaled pilot despread values;

a channel coefficient estimator that estimates channel responses using the scaled pilot despread values to produce channel coefficient estimates;

a combiner that combines the traffic despread values, using the channel coefficient estimates, to obtain detection statistics that correspond to the relative strengths of the plurality of traffic channels and the plurality of pilot channels.

27. A system according to Claim 23 wherein the scale factor estimator comprises:

a pilot channel power estimator; and

a traffic channel power estimator.

29. A system according to Claim 23 wherein the scale factor estimator forms scale factors corresponding to the relative strengths of the plurality of traffic channels and the plurality of pilot channels using pilot despread values and traffic despread values corresponding to a plurality of delays of a transmitted signal.

30. A system according to Claim 23 wherein the receiver comprises a soft handoff receiver.

31. A system according to Claim 27 wherein the traffic channel power estimator comprises an equivalent full rate power traffic channel estimator.